

High School Course Description: Biology

In middle school, GISB students receive a solid introduction to biological aspects of nature and the human body. Using this as a starting point, GISB's four-year high school biology curriculum addresses the topics listed below in depth. Labs are inquiry-based, and a definite emphasis is placed on conceptual and global understandings as well as on problem solving.

By the end of grade 12, our students have mastered all content from the AP Biology course.

For a detailed list of what is covered each year in our intensive biology curriculum, please see below.

Grade 9

The following content is covered during this course:

- Evolution theory
 - Evidence for evolution
 - Human evolution
- Life processes of plants, fungi, and bacteria
 - The cell and structure-function relationships (e.g., leaf)
 - Ingestion and transport of substances
 - Substance and energy change
- Cell as a building block of plants, animals, and humans
 - Basic structure of plant and animal cells
 - Components of cells and functions: cell nucleus, cell membrane, cell plasma, chloroplast, mitochondria, cell wall, and vacuole
 - Comparison of plant and animal cells
 - The development path from unicellular to multicellular organisms using the example of green algae
 - Differentiation of bacterial cells from other cells and viruses from cells

Grade 10

The following content is covered during this course:

- Immunobiology
- Genetics and heredity
 - Cellular basis of heredity
 - Rules of inheritance
 - Molecular basics (meiosis, mitosis)
 - Mendel's laws, non-Mendelian inheritance
- Harvard Medical School Program at Harvard University
 - Differentiated medical foci (respiratory cases, trauma, neurology, and more)

Grade 11

The following content is covered during this course:

- Structure and function of cells and biomembranes
 - Construction of cells (animals and plants)
 - Cell organelles
 - Construction and function of biomembranes
 - Eucaryote vs. procaryote
 - Material transport
- Enzymes as biocatalysts
 - Structure and function
- Energy metabolism in green plants and animals/humans
 - Processes of photosynthesis
 - Processes of cellular respiration
- Molecular Genetics
 - Structure of DNA and RNA
 - Replication
 - Translation
 - Mutations
 - Genetic engineering
- Ecology
 - Biotic and abiotic factors
 - Communication among organisms, ecosystem dynamics
 - Physiology and optima
 - Energy flow within ecosystems



Grade 12

The following content is covered during this course:

- Neurobiology
 - Neuron
 - Structure and function
 - Resting and action potential
 - From stimulation to action
 - Conduction of the action potential
 - Neurotoxins
- Evolution
 - Evolution theory
 - Evolution mechanisms
 - Evidence for evolution
 - Evolution of human

Textbook / Informational Text Reading Amount:

Reading and problems from either/both of the textbooks listed below are assigned for homework.

- **Markl Biologie Oberstufe, Klett, 2016**
- **Markl Biologie 2, Klett, 2020**

Types of Large Assessments in this Course:

- Unit tests, labs, quizzes, midterm exam, final exam, final project